



Volume and Growth of Property Program Lands
Indiana Division of Forestry
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There are approximately 149,445 acres of forest managed by the Properties Program Section of the Indiana DNR – Division of Forestry. In an effort to better understand the forest resources on these lands, different inventory systems over time have been implemented and are briefly described below.

FIA is a federal inventory system across the entire nation and across all ownerships and land uses. The properties program lands contain approximately 50 FIA plots. These plots are measured on a continuous basis, with 1 panel or one-fifth of the plots measured each year. These are fixed-radius permanent plots. Available data from FIA plots in Indiana were most recently measured during the 2003 – 2007 period. The total number of plots found within the property system is 50.

In addition to FIA, the Division of Forestry had a system-wide inventory (SWI) conducted in 2005. An outside entity was contracted to collect data on approximately 1,020 plots. These plots were variable-radius plots and data was measured during 2004 and 2005. Data collected was entered into available software (TwoDog Inventory Software) and results analyzed.

Beginning in 2008, the Division of Forestry began a continuous forest inventory (CFI) system. This system was designed heavily from the FIA system, but at a much higher intensity. Like FIA, 1 panel or one-fifth of the plots will be measured each year. There are a total of approximately 3,825+ plots that will be established over the course of the initial 5 year period. Preliminary results from approximately 348 (9%) panel 1 plots were analyzed mainly to test the functionality of the new program.

The Division of Forestry forwarded a shapefile outlining the property lands to the USFS FIA unit. The USFS produced a list of FIA plots to be included in the analysis. The 50 plots provide excellent information on volume and growth across the system. For attributes such as total acreage and gross volume, all 50 plots were used. For change

data, such as growth, mortality, removals, etc, only the plots visited during the current cycle (4 panels, 2004-2007) were used, resulting in approximately 30 plots.

We used the USFS EVALIDator tool to interpret the data from the 50 FIA plots. We used the custom-built Access database (modeled from the USFS EVALIDator tool) to interpret the preliminary data from the CFI plots. Two Dog Inventory Software was used to interpret the data from the 2005 SWI. Some interesting information:

Total acres of forest land: According to FIA, 163,199 acres plus or minus 12.22 percent. FIA expansion of plots would indicate total acreage involved in this query to be between 143,256 and 183,142 acres, a range within which the GIS acreage would fall. The shapefile contained a total of 149,445 acres, a figure that is within the error range of the FIA expansion. In comparison, the preliminary CFI data shows 145,167 acres plus or minus 1.17 percent, or a range from 143,469 to 146,865 acres. DoF staff will continue to update the properties' shapefile; we will send an updated shape file to the USFS for a new plot list as it becomes available and future comparisons between inventory systems is desired.

Total volume of sawtimber on property system lands from FIA data is 1,549,640,331 board feet, Int. $\frac{1}{4}$ scale, $\pm 15.75\%$. When converted to Doyle using USFS conversion factors by dbh class, the Doyle volume is 1,028,926,682 board feet with a range of 866.9 MMBF to 1,191.0 MMBF, Doyle. For comparison, the 2005 SWI data showed 1,171,353,450 board feet, Doyle. The preliminary CFI data shows 1,018,847,394 board feet when converted to Doyle using USFS conversion factors by DBH class plus or minus 4.42 percent, or a range from 973.8 MMBF to 1,063.9 MMBF, Doyle. These inventory systems are all within the error range of the FIA expansion.

Net growth of sawtimber on forestland (property system lands from FIA data) is 65,674,053 board feet per year, Int. $\frac{1}{4} \pm 21.37\%$, resulting in a range of 51,639,508 to 79,708,598 bd. ft/yr. Net growth is that growth above mortality but includes removals. Converted to Doyle scale, the total annual net growth is 40,439,257 board feet per year, Doyle and a range of 31,797,388 to 49,081,126 bd. ft/yr. For comparison, the 2005 SWI data showed 24,788,950 bd. ft/yr Doyle. At this time, preliminary growth estimates from the CFI data is unavailable. If removals equal net growth, a reasonable interpretation would be that we are harvesting (or removing) 100% of growth. Net growth is a positive number for all species groups.

Saw timber mortality is 3,705,599 bd. ft per year, Int. $\frac{1}{4}$ scale or 1,980,603 daft. per year, Doyle, $\pm 54.22\%$ on property system lands from FIA data. No mortality data is available from either the CFI data or the 2005 SWI data. Saw timber mortality is 0.32% of total standing volume.

Removals of sawtimber averaged 5,932,200 board feet Doyle per year during the 5 year span from 2003-2007 (total volume was 29,661,000 bd. ft Doyle). This would be merchantable saw log volume. To directly compare this with the total and/or growth volumes, one would need to add in the estimated volume of wood fiber not considered

merchantable (volume in such things as butt ends and tops left in the woods). From the latest Timber Product Output Survey and help from FIA, utilization ratios were calculated for the different species groups and applied to the removal figures to “add in” this volume left in the woods, bringing a total estimated removal of 6,889,092 board feet Doyle per year. Comparing this estimated annual removal volume (6.9 MMBF Doyle) to the lower end of the range of net annual growth (31.8 MMBF Doyle) it should be a safe interpretation that sawtimber growth exceeds harvest.

Conclusion

Average annual net growth of lands managed by the Properties Program Section of the Indiana DNR – Division of Forestry is estimated to be 40.4 MMBF Doyle scale. This growth exceeds the estimated annual removal of 6.9 MMBF Doyle.

Table 1. Total Volume and Annual Growth of Indiana DNR-Division of Forestry lands

Volume of sawtimber on forestland (bd. ft.)

DBH	Total	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0-30.9
Int. 1/4 Vol.	1,549,640,331	20,000,906	140,351,803	197,135,536	211,112,517	352,798,773	226,336,960	90,302,292	167,739,810	75,681,659	51,650,062	16,530,014
Doyle	1,028,926,682	6,910,313	58,554,772	100,893,967	124,176,382	231,753,514	162,509,937	70,697,664	139,626,618	66,115,497	48,928,104	18,759,913

Int. to Doyle Conversions	0.3455	0.4172	0.5118	0.5882	0.6569	0.7180	0.7829	0.8324	0.8736	0.9473	1.1349
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Net growth of sawtimber on forestland (bd. ft. per year)

DBH	Total	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0-30.9
Int. 1/4 Vol.	65,674,053	1,249,715	16,308,977	8,395,490	6,022,910	10,547,654	10,444,169	1,676,406	6,471,427	1,644,985	2,693,522	218,798
Doyle	40,439,257	431,777	6,804,105	4,296,812	3,542,676	6,928,754	7,498,913	1,312,458	5,386,816	1,437,059	2,551,573	248,314